Izaac Laundry Mottiar

3B Mechatronics Engineering University of Waterloo

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I'm currently in my third year of Mechatronics Engineering at the University of Waterloo, with a focus on electronics, control systems, and robotics. Feel free to explore my portfolio to learn more about the projects I've worked on.

Technical Skills

Electrical: Experienced in circuit and PCB design, leveraging STM32, Arduino, and Raspberry Pi platforms.
Programming: Fluent in Python, C/C++, MATLAB, MS Excel, JavaScript, CSS with experience in OpenCV.
Mechanical: Skilled in AutoCAD, SolidWorks, and Fusion 360, with experience in 3D Printing and Machining

Work Experience

UW Robotics Team — Firmware Team Member, Waterloo ON. Jan. 2025 - April. 2025

- Implemented SPI communication between STM32 and ERCK 05SPI 360 encoder.
  - Utilized logic analyzer to capture and debug digital signal traces.

Hardware Test Intern — StandardBioTools, Markham ON. Sept. 2024 - Dec. 2024

- Conducted lifecycle testing by integrating a pneumatic actuator and computer vision system to automate physical testing and validate results.
  - Developed a script to manage the process, ensuring autonomous operation and automated result collection.
- Analyzed and certified five gas manifolds by performing leak checks, pressure sensor accuracy tests, and mass flow controller (MFC) precision and resolution analysis.
  - Authored Project Change Requests to address design issues and improve designs.
  - Led supplier meetings to resolve MFC inconsistencies and streamline communication.
  - Developed Python scripts to automate data collection for pressure sensors, flow rates, and leak detection.

Manufacturing Engineering Intern — Greenhouse Juice Co. Mississauga ON. Jan. 2024 - April. 2024

- Integrated the NIMCO Gable Top machine into production, increasing juice production by 10%.
  - Engineered custom jigs and developed UV monitoring protocols for precise liquid flow control.
  - Created an SOP and trained operators for consistent implementation.
- Developed a hydrogen peroxide detection system using OAK-1 PoE and Raspberry Pi 5, enabling real-time monitoring, LED updates, and automated Excel logging.
- Monitored machinery data, performed daily water titration tests, and tracked gas, water, and electricity consumption to optimize resource usage.

Controls Specialist Intern — JMP Solutions, Oakville ON. May. 2023 - Sept. 2023

- Developed and programmed PLCs to regulate the drive speed of two KOBM slurry pumps for ArcelorMittal Dofasco, optimizing operational efficiency.
- Collaborated closely with the Vice President and General Manager of Integration and Engineering Services to successfully complete a corporate-wide file management initiative.
- Drafted nine x-axis motion and nine z-axis motion drives to control multi-cut saws used for cutting exhaust pipes of varying lengths for ArcelorMittal Dofasco.

Projects

Inventory Tracker App

- Built a React Native Expo Go app for wine inventory at Malivoire with dynamic search/add/delete functionality, AsyncStorage persistence, and automated Excel report export.

Two-Axis Motion School Project

- Designed and implemented a precise two-axis STM32 motor control system using ADCs, potentiometers, and interrupts, achieving accurate X/Y motion.

Modelling Segway – SimulationX

- Simulated and optimized Segway motion using Simulink and SimulationX, developing a 3D experimental model and tuning key variables to achieve a stable 5.18 m forward displacement within speed limits.

Thermopile Sensor Design

- Built a thermopile with 3D-printed holder and op-amp circuit, achieving ±1.5°C measurement accuracy.

Education

University of Waterloo — Candidate for Bachelors of Mechatronics Engineering. Sept. 2022 - Present
Secondary School — Graduated with honours diploma and 98% average Sept. 2018 - June. 2022